

REMARKS

Reconsideration in light of the following remarks is respectfully requested. Applicants seek to amend claims and cancel claims in order to comply with the Examiner's requirement as to the form of the claims and/or to put the claims in better form for consideration on appeal. The amendments to the claims are based upon useful discussions with the Examiner regarding the rejections and thus could not have been made at an earlier time.

Applicants thank the Examiner for indicating that claims 54, 60, 68, 74, 75, and 81 are free from prior art.

Telephone Interview

Applicants thank Examiner Collins for the very helpful telephone interview on October 21, 2003. During the interview support for the enablement and written description was discussed and specific passages in the specification were identified. Those passages have been referenced in this response. In addition a possible claim amendment for replacing "commercially acceptable" was discussed.

Claim Amendments

The support for most of the proposed amendments are discussed below. The support for the head size of the harvested broccoli after exposure to heat stress being in the range of "3 to 10 inches" may be found, for example, on page 75. Hybrid 7007 had a head size of 10 inches at market maturity after exposure to heat stress as detailed on pages 68-70.

Claim Objections

The Examiner has objected to claim 72 as having two periods. Applicant has Canceled claim 72 so this rejection is moot.

Claim Rejections – 35 U.S.C. § 112, Second Paragraph

Claims 54, 57-58, 60-61, 64-65, 67-68, 71-72, 74-75, 78-79 and 81 have been rejected as being indefinite for the recitation “commercially acceptable.” The Examiner maintains that definition of commercially acceptable is indefinite because, while defined in the specification, it does not exclude other interpretations of “commercially acceptable.”

Applicants respectfully disagree with the Examiner’s grounds for rejection and the above statements. However, in order to facilitate prosecution in this case applicants have amended the pending claims, without prejudice or disclaimer, to replace the recitation “commercially acceptable” with the recitation “wherein said plant exhibit no heat stress symptoms including one or more of the following: non-uniform beads; brown, yellow, light-green or purple colored heads; flat heads; bracts; rapid fracturing of the head, “cateye”, and hollow stems.” The support for the amendment may be found on page 13, lines 11-20 of the specification (emphasis added).

The heat tolerant broccoli of this invention is capable of producing a commercially acceptable product when grown under heat stress conditions.

Heat stress is exhibited in broccoli by a number of different symptoms. The symptoms include non-uniform beads; brown, yellow, light-green or purple colored heads; flat heads, bracts (leaflets in the head); rapid fracturing of the head, which reduces the harvest period; “cateye” (death of growing points), extremely small heads and hollow stems.

Each of these symptoms is generally viewed as commercially unacceptable.

From the above passages, it is clear that the present invention includes plants that do not display signs of heat stress when grown under elevated temperatures. In addition, the specification discloses actual examples of plants that exhibit the claimed characteristics, i.e., no symptoms of heat stress when exposed to the claimed heat regimes. Citations to such examples are included below in the discussion of the written description rejection.

Claims 54-56, 58-63, 65-70, 72-77, and 79-81 have been rejected as being indefinite for the recitation “at least.” The Examiner maintains “at least” is indefinite because it is an open ended time and temperature range.

Applicants respectfully disagree with the Examiner’s grounds for rejection and the above statements. However, in order to facilitate prosecution in this case applicants have amended the pending claims, without prejudice or disclaimer, to remove the recitation “at least” add specific temperature ranges. The support for the temperature ranges may be found on page 51, which includes a table of temperatures for growth study #1. The table clearly has temperatures ranging up to 100° C (on both 7/22 and 8/11) during the temperature testing. Additional support for the temperature ranges may be found on page 83, which includes a table of temperatures for growth study #3. The table clearly has temperatures ranging up to 100° F during the temperature testing. Thus, the application has support for the proposed amendments.

Therefore applicants respectfully request that the Examiner withdraw the indefiniteness rejections.

Claim Rejections – 35 U.S.C. § 112, First Paragraph

Claims 54-81 have been rejected as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one of ordinary skill that the inventors had possession of the claimed invention at the time the application was filed. The Examiner maintains that while the claim language finds literal support in the specification as filed, the specification does not describe or characterize any actual plant that exhibits the characteristics recited in the claims. The Examiner further states absent the disclosure of actual plants that exhibit the claimed characteristics, the claimed plants are not described.

Applicants respectfully disagree with the rejection and the above statements. The claims find support in the specification in the form of actual plants as follows. For claims 54-55 and claims 61-62, the Examiner is directed to page 52 of the specification. The maximum daily temperature from 09/04 to 09/10 as indicated on Table #1 was between 90 and 100 as recited in

claims 54-55. Furthermore, the temperatures on Table #1 include maximum daily temperatures between 95 and 100 for one day as recited in claims 61-62. The plants exposed to this temperature exhibited no signs of heat stress in accordance with the currently amended claims. The hybrid plants 7007, 7022, and 7028, male plants 7007, 7009, and 7028, and Inbred 393-2-19 and Inbred 393-2-47 all have heat stress numbers of 8 or 9. See Table 2.5, on page 63. These numbers indicates that the hybrid plants displayed no signs of heat stress when exposed to temperatures of 100° F and 105° F, respectively. See page 12, lines 9 to 21. Thus, the specification discloses plants that exhibit the claimed characteristics, i.e, no signs of heat stress at the claimed temperature regimes.

For claims 68-69, the Examiner is directed to page 92 of the specification. The maximum daily temperature from 6/27 to 7/14 as indicated on Table 8 was between 85 and 100. The plants exposed to this temperature exhibited no signs of heat stress. See Table 9, on page 96. Numerous plants have a heat stress number of 7 or above. This number indicates that the hybrid plants displayed not signs of heat stress. See page 12, lines 9 to 21. Thus, the specification discloses plants that exhibit the claimed characteristics.

For claims 75-76, the Examiner is directed to page 68 of the specification. The maximum daily temperature from 8/21 to 9/10 as indicated on Table 3 was between 80 and 100. The plants exposed to this temperature exhibited no signs of heat stress. See Table 4.5, on page 78. The hybrid plant 7009, male plant 7009, and 98-2061 and 98-2192 have a heat stress number of 8 or 9. This number indicates that the hybrid plants displayed not signs of heat stress. See page 12, lines 9 to 21. Thus, the specification discloses plants that exhibit the claimed characteristics.

Summary of Written Description Support

Claims	Temperature	Support for temperature	Support for heat tolerance
54 and 55	90°F-100°F for 5 days	Pg. 52 – 9/04 to 9/10	Pg. 63 – Hybrid 7007, Inbred 393-2-19, etc.
61 and 62	95°F-100°F for 1 day	Pg. 52 – 9/04 and 9/06	Pg. 63 – Hybrid 7007, Inbred 393-2-19, etc.
68 and 69	85°F-100°F for 15 days	Pg. 92 – 6/27 to 7/14	Pg. 96 – 7007, 4201, etc.
75 and 76	80°F-100°F for 20 days	Pg. 68 – 8/21 to 9/10	Pg. 78 – hybrid 7009, 98-2061, etc.

Thus, for all the claims, the specification discloses broccoli plants that have the claimed characteristics. Therefore, applicants respectfully request that the Examiner withdraw the rejection.

Claims 54-81 have been rejected as allegedly containing subject matter which was not described in the specification in such a way as to enable one of ordinary skill in the art to make and use the claimed invention. The Examiner maintains that the claims are unduly broad because one of ordinary skill in the art would require guidance as to which plants to breed in order to produce the claimed invention and therefore it would require undue experimentation for one of skill in the art to determine which lines to start with.

The applicants respectfully disagree. The specification provides a basic breeding protocol that may be used to generate a full range of broccoli. See for example pages 15-20 outlining the breeding protocol used. In addition, the specification discloses several additional examples of breeding different combinations of publicly available broccoli strains that result in heat stress tolerant broccoli that fall within and therefore support the full enablement of the claims. See for example:

Page 16: IM Foods No. 608 crossed to Marathon resulted in 393-1-29. Page 65 indicates that 393-1-29 has the claimed characteristics of no signs of heat stress symptoms.

Page 20: IM Foods No. 608 crossed to Cruiser eventually crossed to 393-1-29 resulted in 4243. Page 96 indicates that 4243-1 has the claimed characteristics of no signs of heat stress symptoms.

Page 23: Marathon selfed resulted in 4462-1. Page 96 indicates that 4462-1 has the claimed characteristics of no signs of heat stress symptoms.

Page 24: Cruiser crossed to Green Belt crossed to Marathon resulted in 4303. Page 97 indicates that 4303 has the claimed characteristics of no signs of heat stress symptoms.

Page 25: IMF608 selfed and then crossed to Cruiser resulted in 4430-1. Page 96 indicates that 4430-1 has the claimed characteristics of no signs of heat stress symptoms.

Thus, the specification clearly shows that the disclosed breeding methods may be used to breed heat tolerant broccoli within the scope of the claims using a number of different starting lines of broccoli. Thus one of skill in the art would have no difficulty in applying the disclosed methods to generate heat tolerant broccoli with essentially any desired characteristic (assuming such characteristic or combination of characteristics exist in currently available lines of broccoli). Therefore, the specification enables one of ordinary skill in the art to make broccoli commensurate in scope with the claims. Furthermore, in their respective Declarations, both David Joynt and Robert Barham, experienced broccoli breeders, indicate that the techniques are likely to work with most starting lines of broccoli.

In addition, as stated in the Declarations of David Joynt and Robert Barham, once a heat tolerant line of broccoli has been generated, such heat tolerant line may be crossed with a non-heat tolerant line with some desired characteristic to yield a heat tolerant broccoli with that desired characteristic in only a few generations. The Declarations provide an example of crossing different heat tolerant lines of broccoli to a non-heat tolerant broccoli, producing a heat tolerant broccoli after a few seasons of selection. Thus again demonstrating that, one of skill in the art could combine the teaching of the present application with traditional broccoli breeding to

generate heat tolerant broccoli of any desired characteristic. Finally, as indicated on page 102 of the specification, four lines of heat tolerant broccoli have been deposited at the American Type Culture Collection and are therefore available to the public. A broccoli breeder could use any one of these four heat tolerant broccoli and cross them to other broccoli to breed broccoli that are heat tolerant and have any other desired trait existing in broccoli.

Claim Rejections – 35 U.S.C. § 102

Claim 61 has been rejected under 35 U.S.C. § 102(b) as being anticipated by Heather et al. (J. Amer. Soc. Hort. Sci. 1992, Vol. 117, No. 6, pages 887-892). The Examiner has asserted that the broccoli strain XPH 5168 taught by Heather et al. has all the claimed characteristics of the claimed invention.

Applicants respectfully disagree with the Examiner's grounds for rejection and the above statements. However, in order to facilitate prosecution in this case applicants have amended the pending claims, without prejudice or disclaimer, to replace the recitation "growth cycle" with the recitation bud development. The application has support for the amendment. The claimed invention is heat tolerant broccoli. Page 6, lines 4-6, of the application defines heat tolerant broccoli as broccoli that produces commercially acceptable heads when grown under heat stress growth conditions. Heat stress growth conditions are further defined on Page 6, lines 8-15, as conditions that would cause normal (i.e. non-heat tolerant broccoli) to display heat stress symptoms. The application clearly explains that the heat stress symptoms only show up when the heat is applied during bud development. See Page 15, line 13 to Page 14, line 6. Since heat exposure during the vegetative phase of the plant (i.e. pre-bud development) would not result in heat stress symptoms, one of skill in the art would understand that heat stress growth conditions do not include the vegetative stage of the plant and would be limited to the bud development stage of the plant. Thus a heat tolerant broccoli plant is one that does not show heat stress symptoms when exposed to heat stress during bud development.

As discussed in the response submitted March 28, 2003, the XPH 5168 broccoli plant taught by Heather et al. only produces commercially acceptable heads when exposed to heat during the vegetative phase (i.e., pre-bud development) or when the heads are ready for harvest (i.e., after bud development). Thus, Heather et al. do not teach a broccoli plant that can produce a broccoli head that does not show signs of heat stress when the heat is applied during bud development.

Applicants therefore respectfully request that the examiner withdraw the 102(b) rejection.

Claim Rejections – Double patenting

Claims 68-74 and 81 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 6,294,715.

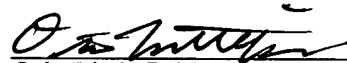
Applicants enclose a terminal disclaimer with the present response.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicant(s) petition(s) for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 500852000101.

Respectfully submitted,

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